Inhalation Therapy

JOURNAL OF THE
AMERICAN ASSOCIATION
OF
INHALATION THERAPISTS

MARCH 1959—VOL. 4 NO. 1

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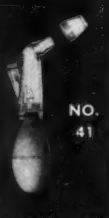

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inhalation therapy

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REGULAR FEATURES

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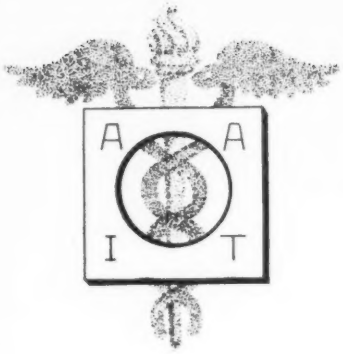

Editorial

Let's Have More!

ONE OF the fondest hopes, and certainly one of the greatest objectives of the AAIT is being fulfilled these days by the increasing number of institutes, symposiums, seminars, clinics, workshops—call them what you will—which are being staged by the chapters.

The educational and other opportunities offered by the annual lecture series are gained only by the fortunate few (relatively) who can manage to attend. We try to give reasonably full coverage to these events in the Journal for the benefit of those who cannot go, but this is no substitute for the first-hand experience.

Therefore, when one of the chapters plans an all-day or several-day meeting of lectures, panel discussions, exhibits and so forth, it means that many more therapists from that area are able to attend than would be possible if they all had to journey half way across the country.

It is a very exciting experience to see and speak face-to-face with notables in the field—to ask questions of authorities during group discussions—to see the newest equipment—to compare notes with other therapists, some in better, some in worse situations than one's own.

What are some of the other advantages or benefits derived from such meetings? Well, for one thing, they raise the therapist's morale. This is not only because of the things just mentioned, or the fun of a day off with pay and expenses paid and the chance to see other therapists. It is also because the things discussed on these programs show that *our work is a very important part of total patient care.* Sometimes, in our own hospitals, plodding along at our own jobs, and with no other therapists around to stimulate us professionally, we tend to lose our perspective and forget this. We look around us at the pharmacy, the X-ray department, the central supply, and feel little and inconsequential beside these physically larger departments. It is nice to have a seminar once in a while to reassure us of our own real importance, and at the same time to re-emphasize our responsibilities to the patient and the hospital.

Another thing these institutes do for us—especially when they are sponsored by hospitals or hospital councils—is that such organizations are made more aware of the magnitude of our work and develop a greater appreciation of their therapists. In other words, these educational sessions make the therapist worth more to his hospital, and the hospital realizes this. It impresses the administrators that now the field of inhalation therapy has grown to the point where national and local organizations both are giving such meetings. This means that the inhalation therapist is becoming a specialist who has meetings of his own to go to, just like the X-ray technicians or medical record librarians. And administrators like to feel that their hospitals are keeping up with the best current therapy.

One very big advantage of the chapter institute over a national meeting is that relatively more individual therapists from the area have a chance for active participation, and by such participation *the therapist becomes better known in his own territory*. All these things facilitate professional development. I did not say they raise the pay—it may be a good while yet before much is done financially—but they add to one's experience and prestige and standing in the hospital, and in other hospitals of the area. And those things are usually prerequisite to monetary advance.

This winter we have already had institutes held by the Upper Midwest, Illinois and Western New York chapters (see Chapter Activities). There may have been others not brought to our attention, and there are others in the planning stage. They've all been well attended, and I think the consensus is that most registrants have gone away enthusiastic and loaded with literature and ideas to try out in their own departments.

Every bit of the hard work involved in having such a meeting is worth it; let's have more!

— James F. Whitacre

Space ship, space suit, plane or rocket—man still needs oxygen

by Frederick H. Green

THE requirements for space travel go far beyond the subjects usually associated with engineering, to take in such fields of knowledge as physiology and psychology. This is because man is, for all practical purposes, *an integral part* of the space travel vehicle. Every design feature must consider his possibilities and limitations, and every system or control circuit within the vehicle must be designed with the man as one of the links in the chain.

An essential feature is the provision of a breathable atmosphere for the man at all times. This problem exists whether we have the man in a space ship or in a so-called space suit, or even if he is flying an airplane which goes so high as to be out of normal contact with the atmosphere.

The routine air conditioning problems which we solve on the earth's surface are duplicated in the air conditioning system for the space ship. These include control of: Temperature, humidity, circulation, and some control of purity of the atmosphere. The added problems which occur when the ship must carry along all the breathable gas which it will use for the entire trip make the task *very much more difficult!* In such a case, the air conditioning system includes equipment to maintain a proper gas for breathing *at a suitable pressure*, in addition to fulfilling all the above requirements.

It is easy to understand this problem if we relate it to current high-altitude aircraft, since we can start with conditions on the surface of the earth, and then note the changes in these conditions and the methods of meeting those changes as the airplane climbs higher and higher.

The important relationship here is the one which exists between the pressure of the atmosphere of an inhabited vehicle and the oxygen content of that atmosphere. The significant parameters are the total pressure of all the gases in the cabin and the effective partial pressures of those gases in the lungs. At sea level the atmosphere is composed normally of nearly 20%

Mr. Green is assistant chief, preliminary design, AiResearch Manufacturing Division, The Garrett Corporation, Los Angeles.

oxygen, 80% nitrogen, and very small percentages of carbon dioxide, water vapor, argon, neon, helium and hydrogen. The total pressure exerted by all these gases at sea level is 760 millimeters of mercury, and the *de*crease in this pressure as the airplane rises through the first 50,000 feet is shown in the uppermost curve of Fig. 1.

The situation in the lungs, however, is not the same as that in the atmosphere. The graph indicates that at sea level the partial pressure of the water vapor is some 47 mm, and the partial pressure of the carbon dioxide is approximately 40 mm. Since the temperature in the lungs remains essentially the same at all times, the partial pressure of the water vapor will not change, even though the total pressure condition may change very decidedly. The CO_2 partial pressure will be somewhat influenced by changes in outside conditions, but it still will remain between 29 and 40 mm. Thus, our lungs really live in an atmosphere which, at sea level, is composed of 6% water vapor, 5% carbon dioxide, 14% oxygen and 75% nitrogen.

As shown on Fig. 1, the total pressure decreases with increase in altitude. Specifically, the total pressure at 17,000 feet is only half of that at sea level. However, the amount of oxygen in the lungs, as shown by its partial pressure, is only 37% of that at sea level. Thus anyone at this altitude will either have to breathe more deeply or

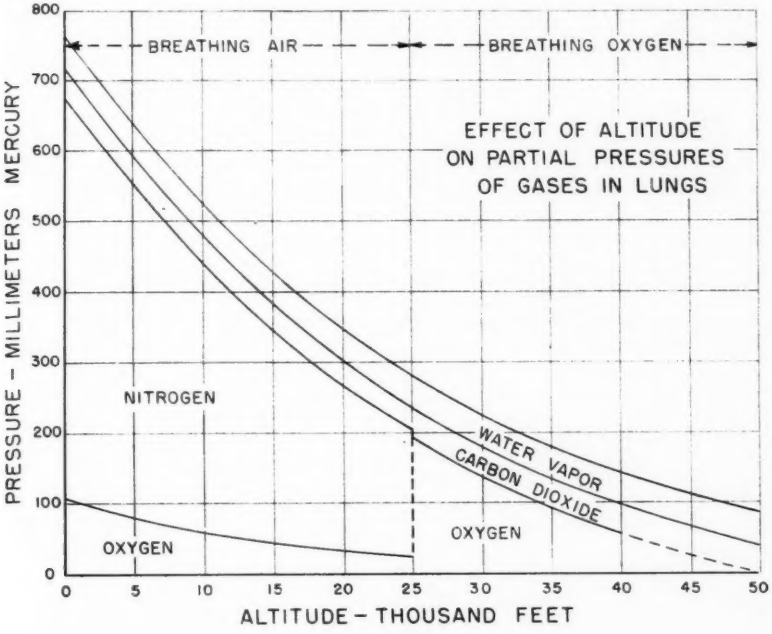

Fig. 1

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High relative humidity may bring better inhalation therapy results

by John R. Greene and Julius L. Bienstock

THEY say everybody talks about the weather but no one does anything about it.

There is one facet of weather which everybody talks about and which everybody *could* do something about if they knew more about it in the first place. Confused? Wait. We've only begun!

The weather subject which everybody talks about, few understand, and everybody could do something about is *relative humidity*. We hear or read about it every day in weather reports. Are you confused when you hear on a cold winter's day that the relative humidity is 90%? This, despite the fact that you know the air is dry in winter. Why is it you feel uncomfortable when the relative humidity is high on a warm day, and do not feel uncomfortable when the relative humidity is high on a cool day?

That's because relative humidity is the *percentage of water vapor actually in the air at a given temperature, as compared with the amount of water vapor that air* could *hold if it were completely saturated.* For example, the "dew point" or *saturation point* of air at 70 degrees Fahrenheit is 8 grains of moisture per cubic foot. (One grain = 65 milligrams; water content of saturated air at 70° would therefore be $8 \times 65 = 520$ mg or 0.52 grams per cubic foot. A gram of water is about one cubic centimeter; hence, this would be about half a cc in each cubic foot of air.) So at 70° F, 100% relative humidity (RH) is 8 grains of moisture per cubic foot. At this temperature, 4 grains would be 50% RH, 2 grains, 25%, etc.

John R. Greene, right, is president of The John Bunn Corporation, Buffalo, New York, and **Julius L. Bienstock,** left, is an independent, equipment manufacturers' representative.

This table shows the amounts of water in the air when it is saturated (100% RH) at different temperatures:

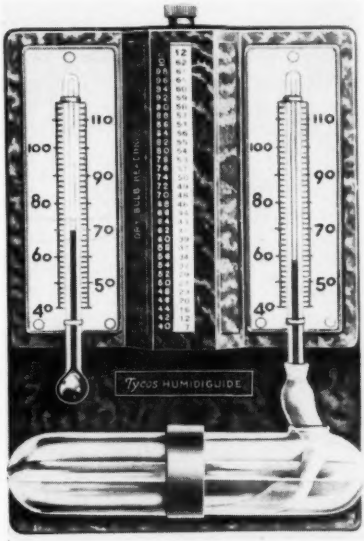
Temperature in degrees F	Grains of water per cubic foot
0	0.5
10	0.8
20	1.2
30	1.9
40	2.4
50	4.1
60	5.7
70	8.0
80	10.9
90	14.8
100	19.8

The table thus answers the two questions posed at the beginning. First, even though there is 90% RH on a cold winter's day, there is very little moisture in the air. The second is more complex. The reason for feeling uncomfortable on a *warm* day when RH is high is that our bodies are cooled by evaporation of perspiration from the skin, and if the air is already nearly at its water saturation point, perspiration does not readily evaporate into the air. Hence the body cannot cool itself, and we are oppressed by the heat. (On the other hand, the same high temperatures are tolerable at *low* RH, because our cooling mechanism is not interfered with.)

In the case of the *cool* day, the body does not *need* to perspire to cool its surface, so the problem of whether the perspiration can evaporate or not doesn't even arise. Hence, we are comfortable at a high RH as long as the ambient temperature does not too closely approach that of our bodies.

Relative humidity is measured by means of hygrometers. Some of these depend on the sensitivity to moisture of certain animal membranes—or, more recently, of specially treated plastic fibres. Others utilize the ability of evaporating water to lower surface temperatures (just as the body does). These are a common and very accurate type, known as wet-and-dry-bulb-thermometer hygrometers (see cut).

The important thing about getting accurate measurements is to keep air moving over the wet bulb to induce the maximum evaporation possible. In the case of the sling psychrometer, one form of the wet-and-dry-bulb type, this is done by whirling the instrument around. For other types, it is advisable to fan the wet bulb.



Taylor Instrument Company

Wet-and-dry-bulb thermometer type of hygrometer with self-contained computing scale.

Therapeutically, in northern climates, we should all use humidifiers in our homes in winter. The cold air which can hold very little moisture comes in through win-

continued on page 22

The smaller hospital can have an inhalation therapy department

by Theodore R. London

CAUGHT in the squeeze between rising costs and the desire to give patients every available service for their more rapid recovery, many small and medium-sized hospitals are faced today with the problem of providing 24-hour-a-day inhalation therapy.

Some of these hospitals, especially smaller ones, may not be able to engage therapists for around-the-clock service. But they *can* establish and operate the one-man department to meet basic needs.

The first consideration for the administrator is cost. Of course a qualified therapist must be secured to operate the department. In most cases, though, this will be the only major cost to the institution since it will already own equipment. For these institutions, a one-man department can be set up to operate during the weekday, daytime hours, with the remaining time covered by other services.

The inhalation therapist, under the advisorship of an interested physician, not only administers therapy, but is constantly engaged in the supervision and promotion of proper techniques of therapy among the nursing staff. He makes everyone caring for an inhalation therapy patient well acquainted with the installation, administration and after-care of equipment. He does this by several methods.

Probably the most effective is bedside instruction where he talks informally to nurses or aides as he uses the equipment. Here the nurses can see and understand exactly what is going on. Occasional exhibits and lectures to individual wards or floors also will help. And for the staff, as well as for himself, he keeps reprints, journals, books and other source material.

For the periods when he is off duty, the therapist, with the administration, sets up coverage by closely cooperating with an already-established 24-hour service

Mr. London is an inhalation therapist at Research and Educational Hospitals, University of Illinois.

such as central supply, an ambulance driver service, the nursing department, and the like. Whatever method is used, the therapist must be sure that those covering off-duty hours are familiar with all the equipment, its location, its use and its care.

His department or storeroom must be set up so that anyone can find what is needed immediately. A large board listing the location of each piece of equipment can be hung in the office or storeroom. This shows at a glance what is available. Too, all equipment is clearly labeled.

Supplementing the department equipment board, a catalogue listing each type of equipment—with its operating instructions – should be placed at each nursing station. This helps physicians and nurses to select proper equipment when the therapist is not there.

Some institutions may want a more intensified program of instruction and training. Then a program is designed that touches as many people as possible as many times as possible. Such a program's goal is to make the entire nursing staff inhalation therapy conscious, which will pay off in better therapy for patients around-the-clock.

Hospitals with professional nursing schools have an advantage, because the inhalation therapy program of the hospital can be integrated with the oxygen therapy instruction of the school. The therapist can be of great value as consultant to the school. And during the three year nurse's training period they can learn much about inhalation therapy techniques.

The question often arises about the department's place in the organization. It must be stressed that inhalation therapy is a full-time operation. It might seem like a good idea to start the service out under the wing of another department such as central supply or nursing—but experience has not borne out the wisdom of this idea. An inhalation therapy department *must* be run by a trained inhalation therapist. To organize under a supervisor who knows little about this field is folly. And to put the service under another department where functions are entirely different is to reduce it to a mere side line operation to be tended when all else has been taken care of. The inhalation therapy department should be directly responsible to the administrator and a medical advisor. It must be independent but, of course, inter-acting smoothly with other units of the hospital.

The AAIT can help

Another point to consider is whether to train or hire. This the administrator must decide according to his institution's needs and abilities. Trained therapists are still few in number. However, there *are* good therapists who are willing to relocate if new positions are made appealing. The American Association of Inhalation Therapists, in Chicago, can help hospitals find qualified inhalation therapists.

Of course an experienced technician can organize and get a program rolling much faster than a man or woman who has to be trained first. Training someone will show good results in time, if there is a qualified instructor. Sometimes institutions in your area with trained therapists will let the un-

concluded on page 30

There has been the need for adequate job descriptions for inhalation therapists in hospitals. A copy of the job analysis used by Baylor University Hospital, Dallas, Texas, has been provided by Mrs. Grace Farley, R.N., director of inhalation therapy there. The Baylor job description is reproduced here for others who want and need such an analysis.

Baylor University Hospital

INHALATION THERAPY DEPARTMENT

Job Description

Department: Inhalation Therapy
Job Title: Therapist-Technician
Number of Employees: Eight

Date: April 18, 1958
Job Number: OT-2
Duty Hours—Rotating
7 a.m.-3 p.m.
3 p.m.-11 p.m.
11 p.m.-7 a.m.
(5 day week)

Sex—Male or Female

SUMMARY:

Under general direction of the Director of Inhalation Therapy, the Therapist-Technician has duties and responsibilities, and performs operations such as: Sets up various pieces of oxygen equipment such as oxygen tents, iron lungs, masks, and infant resuscitators; assembles necessary equipment; sets up apparatus and makes it ready for use; adjusts and repairs equipment already in operation; gives instructions to and requires correct performance from attending nurses; performs any related duties as assigned by the director.

WORK PERFORMED:

1. Sets up or supervises the setting up of all new cases.
2. Visits all Inhalation Therapy cases daily and sees that the physician's orders are being carried out; sees that apparatus is in good condition and that attending nurses are using proper techniques
3. Dispatches and receives all inhalation equipment; keeps a record of the location of each piece of apparatus in use.
4. Sees that inhalation equipment is repaired, cleaned, sterilized, and stored in proper place.
5. In piped hospitals, he may not be responsible for oxygen supplies, but understands the operation of the system and is sure it is working properly.

6. Records all information, clinical or technical, on inhalation therapy patients; relays information daily to business office pertaining to charges.
7. Sees that safety rules are observed; makes sure that all precautions are made known to hospital personnel, patients, and visitors.
8. Sees that all cylinder gases are handled safely and stored safely when in use or in storage room.
9. Assists in instructing nurses, technicians, and any other personnel who may have responsibility in caring for inhalation therapy patients.
10. Keeps informed on current information through literature, exchange of information with other inhalation therapists, and attendance at appropriate professional meetings.

KNOWLEDGE REQUIREMENTS:

Requires completion of high school plus ability to understand and work with various pieces of equipment; requires accuracy in recording information; previous experience in handling oxygen is desirable.

PHYSICAL AND MENTAL REQUIREMENTS:

Requires considerable physical effort in walking and standing for long periods of time; mental dexterity is important in performing specialized therapy procedures; mental adaptability and memory are extremely important in carrying out instructions; emotional stability is important in contacts with personnel, physicians, patients, and visitors. Initiative is required in planning, organizing, and performing duties since much of the work in Inhalation Therapy is emergency.

RESPONSIBILITIES:

Shares responsibility with other members of this department for protecting patients, employees, and others from any possible injury. Job requires responsibility for proper and economical use of equipment, supplies, and medicines by all employees.

WORKING CONDITIONS:

Work is performed in pleasant surroundings with little or no health or accident hazards present. Hours rotate to cover entire 24 hours.

WORKER CHARACTERISTICS:

Requires tact and a very polished manner of speech in numerous contacts with patients. The ability to exercise good judgment and cooperate with others is essential in the performance of duties.

The ability to gain confidence of patients, doctors, relatives, and personnel is very important. Employees must use discretion in handling confidential information concerning patients.

RELATION TO OTHER JOBS:

Promotion from Therapist-Technician to Chief Therapist-Technician.

continued from page 13
do much less work to compensate for this change in oxygen supply.

The practical significance of the 17,000 foot point is that this is the highest altitude at which human beings are known to maintain permanent residence.* This indicates that a human being can adapt himself to an oxygen partial pressure about 37% of the sea level partial pressure. However, such people often have difficulty if they go down to sea level; and sea level dwellers—which include most aviators and space travelers—require up to several weeks to adapt themselves to an altitude as great as 17,000 feet.

When we study Fig. 1 at greater altitudes, we notice that at 25,000 feet the partial pressure of oxygen in the air is very low. This probably represents the limit of operation without pure oxygen for breathing purposes. We notice that even if we change to pure oxygen at 25,000 feet, the *partial pressure* of oxygen will have fallen to the same value as that of air at sea level by the time we reach 33,000 feet.

Lungs filled with CO_2

If we go to 50,000 feet, the pressure of the outside air is essentially the same as the sum of the pressures of the water vapor and the carbon dioxide. This means that no matter how deeply we breathe or expand our lungs, they will remain filled with carbon dioxide and water vapor, and no external air will be brought in.

Thus we see that mere provision of pure oxygen is not sufficient. It must be provided at a *suitable pressure*. In actual practice, the pressure in the lungs must be essentially the same as that of the air immediately surrounding the individual, since no substantial difference in pressure in either direction can be tolerated by the human being.

Another gas essential

Because the oxygen partial pressure using pure oxygen at 33,000 feet condition would be virtually the same as that at sea level breathing air, this really establishes a preferred design pressure point for such equipment, regardless of altitude. That pressure is 175 mm of mercury. In actual practice we expect it will be essential to add some other gas—perhaps nitrogen—in order to avoid problems which will occur if pure oxygen is used in the cabin. Thus, the minimum practical pressure for any long-term space ship will be at least 250 mm of mercury, or about one third of normal sea level pressure.

The method of providing a supply of oxygen in a space ship is necessarily different from that at sea level, because of the premium which is placed on size and weight of equipment. Two methods currently appear feasible. One is that of supplying the oxygen in the form of a gas at very high pressure. This requires the use of storage containers which are relatively heavy, but which can be made essentially leakproof. Another method, definitely to be preferred for flights of short duration, is to carry the oxygen in the form of a liquefied gas. Since this liquid oxygen is extremely cold, it must be carried in a container which closely resembles a thermos bottle.

see Space—page 26

*See article on Peruvian Indians living at high altitudes, **Inhalation Therapy**, Nov. 1956, p. 13.

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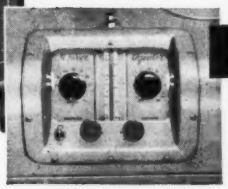

Lighted Control Panel

note oxygen flowmeter (center), temperature and ventilation controls (left and right), oxygen controls (bottom).

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continued from page 15
dows and doors, gradually dropping the humidity of our room air. Physiologically, the body tries to maintain the alveolar air of the lungs at 100% RH at 100 degrees Fahrenheit. As seen by the table, 19.8 grains of moisture are required for every cubic foot of air in order to do this. Even a normal healthy individual has difficulty in accomplishing this when such dry air is continuously inhaled. People therefore become more susceptible to upper respiratory infections under such conditions. The whole thing becomes a vicious cycle once infection sets in, because the lungs depend on the waving cilia lining the trachea to bring up mucus and exudate. These tiny hairs cease to function when dry.

Tank oxygen very dry

In administering oxygen therapy by any method, it should be remembered that the oxygen itself has been completely dehumidified in manufacture. It has been separated from air by lowering the temperature to nearly 300 degrees below zero and liquefied. This dry oxygen administered to any patient for long periods can create many upper respiratory problems unless humidified. This is particularly true of catheters and tents. More and more it is recognized as essential to humidify the air even for rebreathing masks.

Simple humidifying in water bottles is not enough. Free moisture in the form of fog is necessary to *prevent* upper respiratory infections. And it is a *must* for those who already have such a condition.

The drain on body fluids to maintain 19.8 grains of moisture per cubic foot of air, plus fluid to liquefy mucus is a great one. Simply raising the relative humidity of the inhaled oxygen-enriched air to 100% is not enough. This air at, for example, 70° F, would contain only 8 grains of moisture. If fog also were introduced then the system has even less trouble in maintaining the required amount of moisture.

Fog gaining in demand

In tent therapy, the oxygen-enriched air is circulated through cooling coils to maintain a comfortable atmosphere. However, whenever any moisture accumulates through exhalations, it gets taken out as the air passes over the cool coils. About 3 grains of moisture per cubic foot is all that a standard tent can provide. For this reason, the use of tents which can increase the relative humidity and also provide free moisture in the form of fog is gaining in demand. A tent which can also nebulize mucolytic detergents such as Alevaire and Tergemist is important in cases of serious upper respiratory infections.

Quantity is important

There has been a great deal of discussion regarding the size of particles to be dispensed in aerosol therapy. Papers have been written stating the size should be between 3 and 5 microns in diameter. In the first place, a method for measuring such a particle would tax the facilities of even the best-equipped physics laboratory. More importantly, it is now generally agreed that the smallest particles become the gas – water vapor – and the larger ones become partially water vapor and partially smaller par-

see RH—page 26

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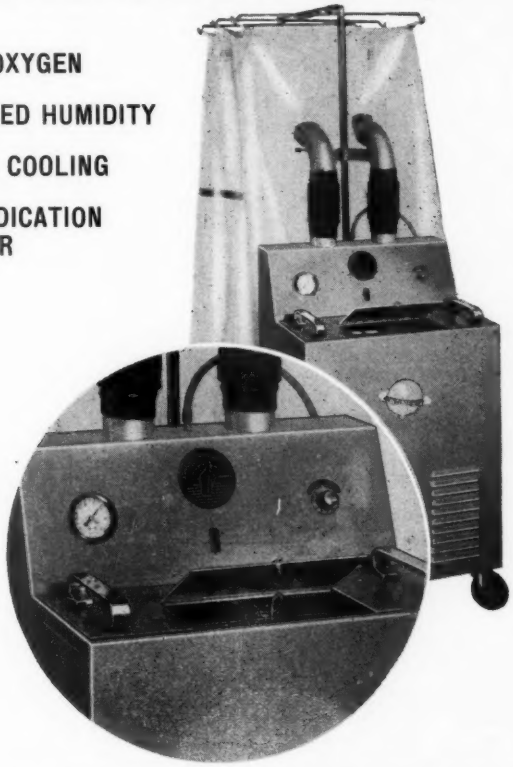

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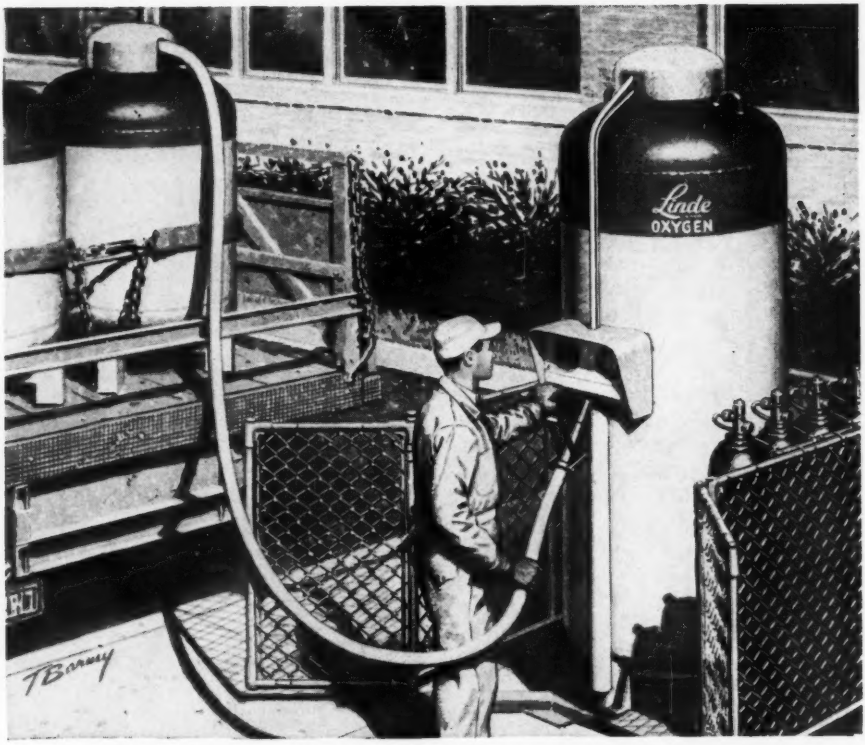

...more hospitals can have LIQUID OXYGEN!

LINDE's new ATX liquid oxygen storage and converter unit is just what many hospitals have been waiting for! It offers the greater efficiency and economy of a liquid oxygen system.

Liquid oxygen for the ATX unit is supplied by your local LINDE distributor as well as directly from LINDE. The unit can be installed on a level area of 5 x 5 feet. No capital investment on your part is required.

If your location or consumption rate has made it impractical for you to utilize oxygen in liquid form, find out now whether you can benefit from this new ATX unit with local service.

For information, call your nearby LINDE Distributor or LINDE office. Or write Dept. IY-3, LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. In Canada: Linde Company, Division of Union Carbide Canada Limited.

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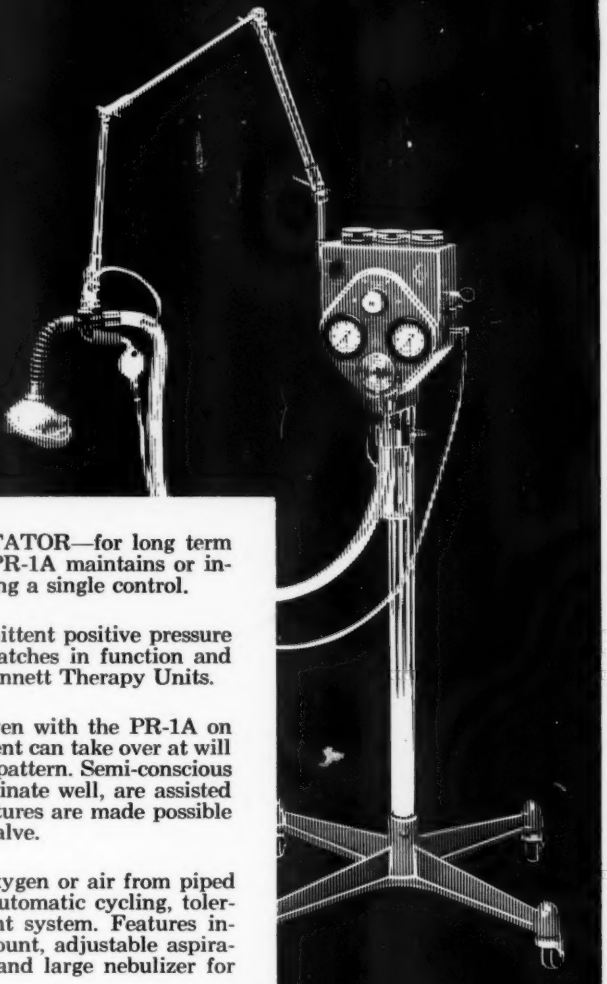
BENNETT MODEL PR-1A RESPIRATOR



- HOSPITAL RESUSCITATOR—for long term or emergency use. The PR-1A maintains or insures respiration by setting a single control.
- IPPB UNIT—for intermittent positive pressure breathing, the PR-1A matches in function and operation the familiar Bennett Therapy Units.
- FLOW-SENSITIVE—even with the PR-1A on automatic cycling, a patient can take over at will with his own respiratory pattern. Semi-conscious patients, unable to coordinate well, are assisted automatically. These features are made possible by the unique Bennett Valve.
- ADAPTABLE—Uses oxygen or air from piped source or cylinder. On automatic cycling, tolerates gross leak in patient system. Features include simple pedestal mount, adjustable aspirator, air/oxygen diluter, and large nebulizer for long term use.

Model PR-1A Respiration Unit $550.00, FOB Los Angeles

Write for literature or demonstration

BENNETT RESPIRATION PRODUCTS, INC.

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Distributed East of the Continental Divide by Puritan Compressed Gas Corp.

Space—from page 20

Fig. 2 shows such a container. This consists of two concentric spheres, one inside the other, separated by a very high vacuum. The liquid oxygen is within the inner sphere and remains relatively cold, because it is effectively isolated heatwise from the warmer surroundings. In actual usage, of course, some heat does leak through, and approximately one per cent of the liquid oxygen will boil off each hour. This can be reduced, but not eliminated, by use of moderate pressure within the cylinder, controlled by appropriate safety valves. The gas will form above the liquid oxygen, and act as a pressurizing medium; thus a tube leading into the liquid can be used for withdrawing the liquid oxygen.

The liquid oxygen withdrawn from the container cannot be used in that state, and must be warmed sufficiently to turn it into a gas. This is accomplished by means of a simple heat exchanger—usually a coil of tubing—which takes heat from the surroundings to convert the liquid oxygen to gaseous oxygen for breathing purposes.

Other features of the oxygen container include economizers for minimizing loss due to storage, apparatus which will make the container operate even though no gravity is present, and devices to indicate the amount of liquid oxygen remaining in the container.

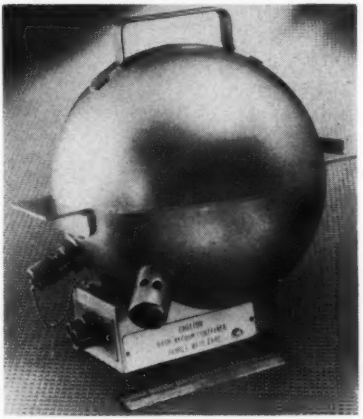

Fig. 2

It is apparent that the equipment which is required for the support of life under space travel conditions is a natural extension of that which is now being used on high altitude aircraft. The first man to travel beyond our planet will be completely dependent on a continuous, controlled supply of oxygen at all times.

RH—from page 22

ticles. Too large a droplet does, of course, settle out. In all fairness it may be said that a uniform droplet may be important in dispensing aerosol antibiotics. *For humidification purposes, however, the exact size of the drop is far less important than quantity.* We should just try to provide a high relative humidity plus lots of fog.

There are many cases where oxygen therapy without high humidity is contra-indicated. We know of none, although there may well be, where oxygen is indicated and at the same time where high humidity is contra-indicated. In many cases, the humidity is as important as the oxygen as a life-saving measure. It is quite probable that with the use of high humidity as the general rule (rather than as the exception), better inhalation therapy results would be obtained.

How are you treating older children?

• We invite your attention to an important development in high-humidity, "fog-room" therapy for older children — a new concept in the treatment of upper respiratory congestion made possible by the new Walton Model HA Humidifier, which:

1. *Eliminates confinement of patients* (occuring when using infant type units for older children).
2. *Maintains "fog-room" conditions at bedside.* (Great quantities of fine vapor are introduced into a tremendously large canopy.)
3. *Maintains ideal temperatures inside canopy.* (The Walton flow-through air circulation method eliminates high temperatures usually associated with canopies.)
4. *Assures proper exchange of air inside canopy.* (Thanks to air-flow-through method.)
5. *Makes it possible to regulate amount of moisture evaporated.*
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10. *Permits no heat or temperature rise in humidified space* (because of the "Cold Steam"* method of operation pioneered by Walton).
11. *Allows addition of water soluble medication in quantity.*

Of special interest: Walton is instituting a national rental program on its room type models available to your patients through your local surgical or drug houses. We would be pleased to send rental information to you or to your dealer.

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Irvington 11, N. J.

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Please send free literature on ( ) the Walton Model HA Humidifier. ( ) Walton equipment rental program. ( ) Walton "Cold Steam".

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CHAPTER ACTIVITIES

by Jack Sangster

WITH charters issued to two more chapters, the AAIT now has 16 chapters from Connecticut to California, from Quebec to Texas and Florida! More are being formed.

The newest chapter is the second one in Canada—**Southern Ontario,** with headquarters in Toronto. The 15th chapter is **Southern California,** centered in Covina. The Southern Ontario charter was presented to George Dean of the Department of Veteran's Affairs Hospital, by Dr. Edwin R. Levine of the AAIT Advisory Board, as a highlight of the annual meeting in Buffalo of the **Western New York Chapter.**

The **Southern California** charter was presented by Sister M. Borromea, O.S.F., St. Francis Hospital, Escanaba, Michigan, a former AAIT board member, to Mrs. Constance Cypert, Inter-Community Hospital, Covina.

Southern Ontario chapter's new officers include: Mr. Dean, president; William B. Moase, Queensway General Hospital, vice president; and Miss Phyllis Bryant, Women's College Hospital, secretary-treasurer.

The **Upper Midwest Chapter** held an all-day institute at Little Falls Hospital, Little Falls, Minnesota, featuring Dr. E. J. Schmitz, thoracic and general surgeon, of St. Cloud, Minnesota, speaking on "Inhalation Therapy for the Postoperative Patient". More than 50 attended from Minnesota and surrounding states.

Dr. C. R. Macpherson, assistant director of clinical laboratories, The Ohio State University, Columbus, Ohio, spoke on "Inhalation Therapy—a Possible Source of Infection" (see INHALATION THERAPY, September 1958, p. 16) and Dr. Schmitz was moderator of a workshop on "Improving Inhalation Therapy for Better Patient Care".

The **Western New York Chapter** has elected these officers: Mrs. E. Ruth Mullen, Millard Fillmore Hospital, Buffalo, president; Earl B. Hockman, Greene & Kellogg, Inc., Buffalo, vice president; James F. Whitacre, Strong Memorial Hospital, Rochester, secretary; and Arthur J. Sasala, Greene & Kellogg, treasurer.

The chapter's first annual institute was an all-day seminar on IPPB and pulmonary function testing with an attendance of 136. Dr. Levine's luncheon talk was a general discussion of these subjects, following a panel on the organiza-

Sister Borromea presents charter to Mrs. Constance Cypert.

George Dean, right, Southern Ontario chapter president, receives charter from Dr. Edwin R. Levine of the AAIT board of advisors.

tion of the pulmonary function-IPPB department and a talk on "Basic Pulmonary Function Testing" by H. Paul Longstreth, M.D., assistant dean, University of Buffalo School of Medicine.

The **Illinois (Alpha) Chapter,** too, has held an institute—a three-day clinic-workshop at the Edgewater Hospital with 115 registrations from six states.

Speakers and their topics included:

Dr. Levine, "Physiological Basis for Inhalation Therapy"; Joseph R. Christian, M.D., senior pediatrician, Mercy Hospital, Chicago, "Inhalation Therapy in Children"; John Rankin, M.D., assistant professor of medicine, cardiovascular section, University of Wisconsin, Madison, "High Oxygen Concentration, Indications, Techniques"; Cecilia E. Miller, M.D., director, department of anesthesiology, South Chicago Community Hospital, Chicago, "Moderate Oxygen Concentrations, Indications, Techniques"; L. A. Fruik, director, inhalation therapy department, Edgewater Hospital, Chicago, "Nasal Catheters, Masks, Face Pieces, Humidification"; Albert H. Andrews, Jr., M.D., department of otolaryngology and research laboratory, Presbyterian-St. Luke's Hospital, Chicago, "High Humidity and Aerosols" and "Tents, Incubators, Hoods, Croup Tents" and "Inhalation Therapy in the Tracheotomized Patient"; Abel Froman, M.D., attending staff, Edgewater Hospital, "Breathing Exercises for Respiratory Cripples"; M. S. Mazel, M.D., medical director and chief surgeon, Edgewater Hospital, "Cardiopexy and Internal Mammary Artery Ligation"; David W. Cugell, M.D., assistant professor of medicine, Northwestern University Medical School, Chicago, "Pulmonary Function, Its Diagnostic Use in Selection of Patients for Surgery, IPPB Research, Inhalation Therapy Evaluation"; Dr. Levine, "Asthma, Emphysema, Silicosis" and "Inhalation Therapy Procedures in Acute Cardiac Conditions"; and "Resuscitation of the Newborn" and "Atelectasis and Bronchial Drainage: Retention of Secretions"; Dean Brown, department of bacteriology, Edgewater Hospital, "Prevention of Cross Infections, Inhalation Therapy—an Unsuspected Source of Hospital Infection"; George A. Saxton, Jr., M.D., senior physician, associate professor of preventive medicine, University of Illinois College of Medicine, Chicago, "Evaluation of a New Type of Respirator—the Pneumobelt"; E. Trier Morch, director of anesthesia at Cook County Hospital, Chicago, "Resuscitation" and "Cardiac Standstill"; and Philip Kaplan, M.D., president of the medical staff, Edgewater Hospital, "Postoperative Indications for Inhalation Therapy".

Choose new officers

The new officers are: Mr. Fruik, president; Edward L. Leveille, Presbyterian-St. Luke's Hospital, vice president; Harvey O. Burtnett, Edgewater Hospital, secretary; and Mrs. Esther H. Smith, St. Elizabeth's Hospital, treasurer. In addition to the officers, the board of directors includes: Robert L. Kruse, Aamed Inc., Oak Park, Illinois; Sister M. Louise, S.S.C., Holy Cross Hospital, Chicago; James E. Monroe, Sherman Hospital, Elgin; and J. Howard Newell, American Medical Oxygen Service, Hammond, Indiana.

continued from page 17

trained person work and study in their department for a few weeks.

Aids to the new therapist can be found in many books, journals, pamphlets, and reprints on inhalation therapy and respiratory functioning. Also, throughout most of the United States there are members of the AAIT to be found; and there are 16 chapters with more being formed. Membership in the Association and a chapter will prove beneficial.

As for basic qualifications there are several any trainee must have: High school graduation, ability to work smoothly with others, some mechanical aptitude, and the ability to express himself clearly. Initiative also is important.

The success of a one-man department depends almost entirely upon the abilities of the therapist. From the beginning he must sell the hospital staff on inhalation therapy itself and his skills and knowledge in his field. He must be able to establish rapport with the many persons who work with the patient for it is they who will carry out, in his absence, the program which he initiates.

To be sure, the one-man department cannot function as well as the around-the-clock department. However, if these various ideas are followed, one man can meet the primary needs of most smaller institutions until more therapists can be added to the department.

EDITOR'S CORNER

New Therapy Handbook

THE NEW NCG INHALATION THERAPY HANDBOOK, edited by AAIT president Don E. Gilbert, is a worthy companion volume to Dr. Edwin R. Levine's EFFECTIVE INHALATION THERAPY, which NCG published several years ago.

Don E. Gilbert

The new handbook's sections cover fundamentals of inhalation therapy, various aspects of gas supply, and apparatus. The apparatus section gives detailed descriptions of the equipment and explicit instructions for use.

The booklet is available without charge from the National Cylinder Gas Division of Chemetron Corporation, 840 North Michigan Avenue, Chicago 11, Illinois, or from local NCG representatives.

It should be on every therapist's desk.

Diameter Safety System

The Compressed Gas Association has developed a new safety system which makes it impossible to interchange low-pressure medical gas connections.

In introducing this system, the CGA is seeking further to reduce the possibility of human error in the administration of inhalation anesthetics, oxygen therapy, resuscitation and aspiration. Connections for each gas have their own special diameters, and hence cannot be mated with connections for any other gas.

Apparatus and cylinders featuring both the Pin-Indexing and the Diameter Index Safety systems are a very great advance in the field of accident prevention over the former equipment (both high- and low-pressure) which could be interchanged freely.

People can say what they want about the convenience of the old way, but it only takes an accident of the sort caused by that kind of convenience to make one vote heartily for Pin-indexing and the Diameter Index Safety System too!

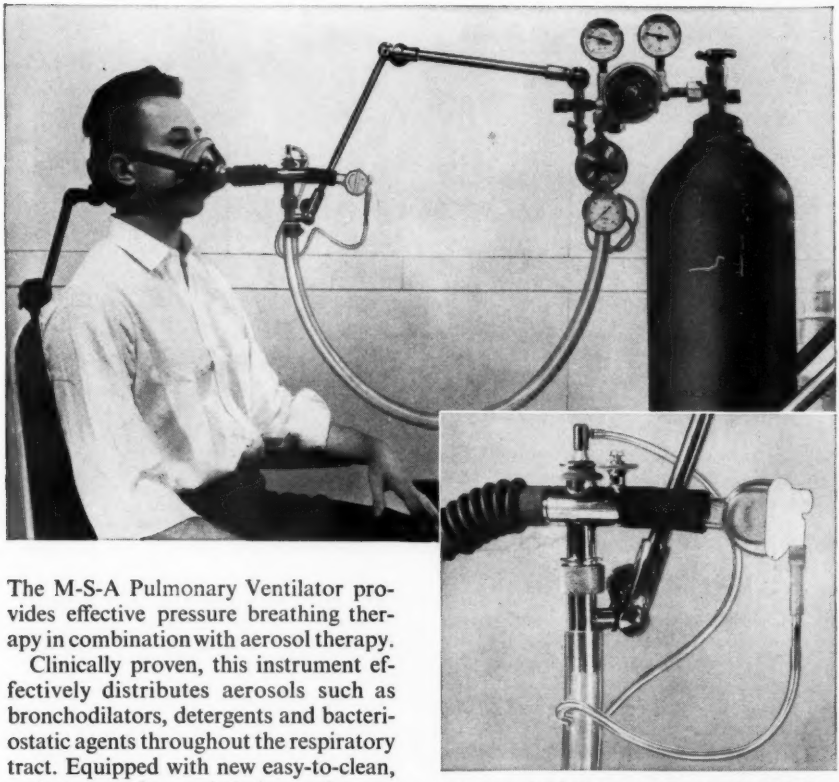
Tri-State Assembly

The Tri-State Hospital Assembly will meet at the Palmer House in Chicago again this year, April 27-29. The AAIT holds sessions at this meeting and the board of directors customarily meets during the convention. For information about lectures and panel discussions to be presented, write the chairman of the AAIT Tri-State meeting committee, J. Howard Newell, American Medical Oxygen Service, 5908 Columbia Avenue, Hammond, Indiana.

Dr. Andrews' Grant

A $3,200 research grant has been made to Dr. Albert H. Andrews, Jr., director, the respiration laboratory, Presbyterian-St. Luke's Hospital, Chicago, by the Tuberculosis Institute of Chicago and Cook County. Dr. Andrews, of course, is a member of the AAIT board of advisors.

For the efficient and simplified administration of I. P. P. B. I. therapy . . . the improved M-S-A Pulmonary Ventilator . . . mobile or cylinder model



The M-S-A Pulmonary Ventilator provides effective pressure breathing therapy in combination with aerosol therapy.

Clinically proven, this instrument effectively distributes aerosols such as bronchodilators, detergents and bacteriostatic agents throughout the respiratory tract. Equipped with new easy-to-clean, maintenance-free exhalation valve assembly. Operates from either a piped system or an oxygen cylinder.

Ease of operation permits quick, efficient application in hospitals, doctors' offices or in patient's home under physician's directions. Produces dramatic relief for most patients suffering from Emphysema, Asthma, Silicosis and similar diseases. May we *demonstrate* these and other advantages of this unit?

Note: the new M-S-A Pulmonary Ventilator provides both dilution and 100% oxygen. It is sold only on the prescription of a licensed physician or on the order of properly qualified hospitals and other institutions.

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WORTH NOTING

RESCUE BREATHING, distributed by the New York State Society of Anesthesiologists, and *available free of charge from Health Research, Inc., 666 Elm Street, Buffalo 3, New York,* is a 20-page handbook prepared by Drs. J. O. Elam and H. M. Ruben of Roswell Park Memorial Institute, Buffalo, under the combined auspices of the United States Army and the NYSSA.

Inasmuch as the efficacy of expired air resuscitation is now accepted by the American Red Cross, National Research Council, American Academy of Sciences, Defense Department and numerous other agencies, it is important that the variations of this method should be available and familiar to all those involved in inhalation therapy.

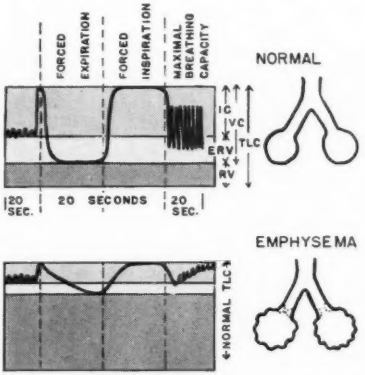
Aspects of the subject covered in this manual are mouth-to-mouth, mouth-to-nose, mouth-to-mask and mouth-to-airway techniques, as well as the use of portable devices. Much emphasis is placed on ways of securing and maintaining an open airway (see September 1958 INHALATION THERAPY, page 18). There are sections on special methods for children, excess fluid and air in the stomach, and on how to judge whether your attempts are successful.

"Obstructive Pulmonary Emphysema," by Robert L. Mayock, M.D., in *The New Physician,* March 1958.

This is a nine-page illustrated article which develops the concept of this type of emphysema, its causes, its course and its treatment. There are several figures reproduced from Comroe's THE LUNG, one of which is reprinted here.

Included are X-ray photographs and a set of tables summarizing such important aspects as "Pathology of Pulmonary Emphysema," "Value of Pulmonary Function Studies in Emphysema," "Why Emphysema Patients Fail to Follow Recommendations," "Outline of Therapy," "Treatment of Respiratory Acidotic Coma," etc.

In discussing bronchodilator and vasoconstrictor aerosol therapy of emphysema, Dr. Mayock asserts that, "IPPB has had many recent enthusiastic supporters for routine use; but, in my experience, it is only occasionally necessary. *Proper instruction* in the use of the nebulizer is very important, and if the nebulizer is used correctly, it gives excellent results without the use of pressure. In the patient who is unable to coordinate the nebulizer with inspiration, or who cannot take a deep breath, additional help can be obtained with the use of the intermittent positive pressure apparatus."



Changes in the spirogram in emphysema. TLC, total lung capacity; VC, vital capacity; IC, inspiratory capacity; ERV, expiratory reserve volume; RV, residual volume.

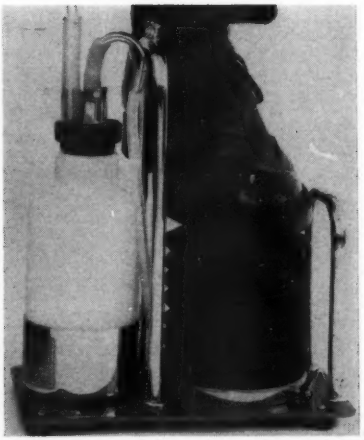
Normal subject: The spirogram demonstrates that the tidal volume is in the midportion of the vital capacity. A forced expiration is performed rapidly with 81% of the vital capacity expelled in one second and 97% in three seconds.

The patient with emphysema: Tidal breathing is carried out at a larger lung volume. The residual volume is greatly increased at the expense of both inspiratory capacity and the expiratory reserve volume. A forced expiration is greatly prolonged, requiring 10 seconds for total expulsion. The one-second vital capacity is greatly reduced (approximately 30% of the vital capacity) with a corresponding decrease in the three-second vital capacity) A forced inspiration also is slowed but to a lesser extent. The maximal breathing capacity is greatly reduced, with a rise in base line due to "trapping" from incomplete expiration. (From Comroe et al., THE LUNG, Year Book Publishers, Inc., 1955.)

In the treatment of hypoventilation and resulting acidosis and coma, however, he says that IPPB or other mechanical ventilation aids, such as the full tank respirator, may have to be used.

EQUIPMENT NEWS

(Information and photographs supplied by the manufacturers or distributors)



The AMBU resuscitator has an anesthesia-type breathing bag coupled to a face mask; and a suction pump operated by a foot bellows. Both are available with or without carrying cases.

AMBU Resuscitation Kit

The AMBU (Air-Mask-Bag-Unit) Resuscitation-Suction kit, designed by Dr. Henning Ruben of the Finsen Institute, Copenhagen, Denmark, is now available from the Air-Shields Company of Hatboro, Pennsylvania.

The resuscitator has an anesthesia type breathing bag with special foam rubber inserts which inflate it with air after it has been squeezed. This is coupled to a face mask by a non-rebreathing valve. The unit is capable of delivering volumes up to 700 cc per squeeze, at pressures up to about 22 cm of water, though these values vary with subject and operator. The bag also is available with an additional valve through which supplemental oxygen may be given. Three sizes of oral airways complete the kit.

The suction pump is a foot-operated neoprene bellows with a stainless steel spring inside which re-expands it. This is connected to a plastic trap bottle, and both are mounted on a rubber-footed metal base. The pump will develop

approximately 12" (or 300 mm) of mercury negative pressure on each expansion of the bellows.

The pump and resuscitator are available singly with or without carrying cases, or with a double case to accommodate both units. **No. 411**

The Infantair 1600

Continental Hospital Industries, Inc. is introducing the Infantair 1600—a four-purpose model which incorporates the functions of an incubator, oxygen tent, surgical bed, heated bassinett, and isolation unit.

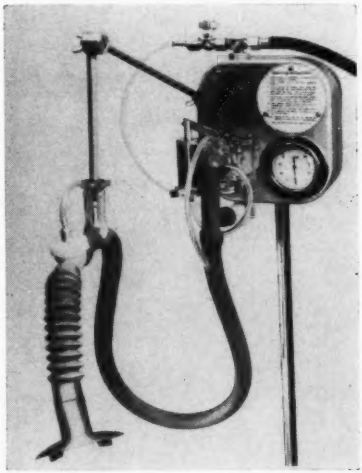
The spacious 100% transparent hood has five self-closing entry ports and is equipped to provide thermostatically controlled heat or cooling. The hood also opens to a full 90 degree angle for X-ray or surgery. Trendelenburg adjustment is controlled from outside the infant area.

Another feature is the new Crometal finish which resembles, and endures like, stainless steel.

The Infantair 1600 may be obtained as a separate unit; with the new lightweight tubular stand; or complete with stand, the shelved storage cabinet, and nebulizer. **No. 412**

The Dotco Respirator

The Dotco Respirator is manufactured by the Duncan Oxygen Therapy Company and marketed by the Ohio Chemical & Surgical Equipment Company. It is an IPPB unit incorporating the Halliburton valve, which features (in addition to the usual characteristics of such valves) a very delicately adjustable sensitivity. Another unique feature of this machine is the nebulizer and its location. This is a very high volume output nebulizer which is situated just outside the valve and before—instead of after—the long tube that carries gas to the exhalation



valve manifold. This means that the nebulizer's output can fill the whole hose instead of only the small manifold, which results in much more moistened gas getting to the patient.

As with other IPPB equipment, the Dotco is available with or without automatic cycler, and in either cylinder or pipeline models. **No. 413**

MORE DATA . . .

. . . can be obtained by mailing this coupon to "Inhalation Therapy," Room 904, 332 So. Michigan Ave., Chicago 4, Ill.

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. . . anywhere in the hospital . . . quickly, easily, and quietly with the new **Model C Hydrojette®**

NEW MODEL C HYDROJETTE® humidifier is unexcelled for convenient, simple, direct administration of cool-vapor therapy in croup, asthma, bronchitis and other respiratory disorders. Cool, moisture-laden fog also relieves intubation irritation and post-operative dehydration of the respiratory tract.

Each Model C Hydrojette consists of—

- **Adjustable, counterpoised Hydrojette Arm** and vapor delivery head to provide cool mist *at the airway* without mask or tent. The delivery head may be adjusted to any position by the patient, thus saving valuable nursing time. This movable arm fits a special bracket on the . . .
- **New Hydrojette utility table.** Rolls quietly and easily on large rubber casters to any room or ward in the hospital. The sturdy lightweight table provides stainless steel work surface, handy storage drawer and a "floating" vibration-free platform on hollow rubber suspension mounts for the . . .
- **Trouble-free Dia-Pump®** compressor-aspirator, with new MICRO-FILTER which removes microscopic air contaminants down to 0.5 micron in size, to provide a *safe* source of compressed air to operate the HYDROJETTE.

The new **Model C** *Hydrojette®*

mobile humidifier-aspirator by *AIR-SHIELDS, INC.* Hatboro, Pa.

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